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LIMITED SITE ASSESSMENT REPORT FORMER UST-25 BUILDING 25 POST LANE MCB  
CAMP LEJEUNE NC  
7/1/2011  
CH2M HILL

**Limited Site Assessment Report  
Former UST-25, Building 25 at Post Lane**

**Marine Corps Base Camp Lejeune  
Jacksonville, Onslow County, North Carolina**

**Task Order Number: WE31**

**July 2011**

Prepared for

**Department of the Navy  
Naval Facilities Engineering Command  
Mid-Atlantic**

Under the

**NAVFAC CLEAN 1000 Program  
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# Acronyms and Abbreviations

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AHEC	AH Environmental Consultants
amsl	above mean sea level
AST	above ground storage tank
bgs	below ground surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CVOC	chlorinated volatile organic compound
DOT	Department of Transportation
EPH	extractable petroleum hydrocarbons
ESCTP	Environmental Security Technology Certification Program
FID	flame ionization detection
Fm	Formation
ft	foot/feet
ft/day	feet per day
GCL	gross contamination level
ID	inner diameter
IDW	investigation-derived waste
IRP	Installation Restoration Program
ISCO	in-situ chemical oxidation
lbs	pounds
LSA	Limited Site Assessment
LUC	land use control
µg/kg	micrograms per kilogram
µg/L	micrograms per liter
MADEP	Massachusetts Department of Environmental Protection
MCB CamLej	Marine Corps Base Camp Lejeune
mg/kg	milligrams per kilogram
MSCC	maximum soil contamination concentration
NAVFAC	Naval Facilities Engineering Command Mid-Atlantic
NCDEH	North Carolina Department of Environmental Health
NCDENR	North Carolina Department of Environment and Natural Resources
NCGWQS	North Carolina Groundwater Quality Standard
ORP	oxidation-reduction potential
OU	Operable Unit
PCE	tetrachloroethene
ppm	parts per million
RI	Remedial Investigation

SEAR	surfactant enhanced aquifer remediation
SVOC	semi-volatile organic compound
SWAP	Source Water Assessment Program
TCE	trichloroethene
TPH	total petroleum hydrocarbons
USEPA	United States Environmental Protection Agency
UST	underground storage tank
VOC	volatile organic compound
VPH	volatile petroleum hydrocarbons
WHPP	Wellhead Protection Program
wt.	by weight
ZVI	zero valent iron

# Purpose of Investigation

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The purpose of this Limited Site Assessment (LSA) is to provide the North Carolina Department of Environment and Natural Resources (NCDENR) Division of Waste Management, Underground Storage Tank (UST) Section with the necessary information to classify the level of environmental risk associated with a petroleum release at former UST-25. This LSA was conducted by CH2M HILL for the Naval Facilities Engineering Command Mid-Atlantic (NAVFAC) in accordance with the December 2008, NCDENR *Guidelines for Assessment and Corrective Action for UST Releases (UST Guidelines)*, amended with updated regulatory standards in January 2010 (NCDENR 2008, 2010a, 2010b), and the *Work Plan for Phase I Limited Site Assessments and Administrative Closure at UST/AST Sites* (CH2M HILL, 2010).

## SECTION 1

# Site Information

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## 1.1 Site Identification

<b>Date of Report:</b>	July 2011
<b>Facility ID:</b>	0-002740
<b>UST Incident #</b>	32405
<b>UST Number</b>	WI-7278 (also listed as WI-474)
<b>Site Name:</b>	Former UST-25, Former Building 25 on Post Lane
<b>Location:</b>	MCB CamLej, Onslow County, North Carolina
<b>Nearest City/Town:</b>	Jacksonville
<b>UST Owner</b>	Commanding General – MCB Camp Lejeune I&E/EMD/EQD PSC 2004 MCB Camp Lejeune, NC 28542-0004 910-451-5068
<b>UST Operator</b>	Same As Above
<b>Property Owner</b>	Same As Above
<b>Property Occupant</b>	Parking lot for administrative offices Located between Post Lane and Virginia Dare Drive
<b>Consultant/Contractor:</b>	CH2M HILL, Inc. 3201 Beechleaf Court, Suite 300 Raleigh, NC 27604
<b>Analytical Laboratory</b>	Katahdin Analytical 600 Technology Way Scarborough, ME 04074

## 1.2 Release Information

<b>Date Release Discovered:</b>	1995
<b>Estimated Quantity of Release:</b>	Unknown
<b>Potential Source of Release:</b>	Former UST
<b>Size and Content of UST:</b>	Five 750-gallon tanks for storing Varsol™

**Latitude and Longitude:** N 34° 40' 16.723"  
W 77° 20' 55.011"

### 1.3 Certification

I, Daniel Hockett a certified Professional Engineer/ Licensed Geologist (circle one) for CH2M HILL, do certify that the information contained in this report is correct and accurate to the best of my knowledge.



# Site History and Characterization

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## 2.1 Site Description

Marine Corps Base Camp Lejeune (MCB CamLej) encompasses approximately 236 square miles of land in Onslow County, NC, adjacent to the southern boundary of the City of Jacksonville (**Figure 2-1**). Jacksonville is the largest city near MCB CamLej and contains approximately half of the county's total population. Since 1990, much of the MCB CamLej complex has been part of Jacksonville. The remaining areas adjacent to the Base are generally rural. The Base is bordered by the Atlantic Ocean to the south, U.S. Route 17 to the west, State Route 24 to the north, the town of Hubert, North Carolina, to the east, and is bisected by the New River, which flows into the Atlantic Ocean in a southeasterly direction.

The former underground storage tank (UST) system was located at the former Base Dry Cleaning Facility (former Building 25) on Post Lane, approximately 500 feet (ft) east of the intersection of Post Lane and McHugh Boulevard, on the Mainside portion of MCB CamLej. **Figure 2-2** illustrates the location of UST-25. The site is currently an asphalt parking lot. UST-25 is located within the bounds of an Installation Restoration Program (IRP) site, managed under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) program, known as Operable Unit (OU) 15, Site 88.

## 2.2 Environmental History of Building 25

The former Base Dry Cleaning Facility (former Building 25) operated from the 1940s until 2004. Five USTs were reportedly installed in the 1940s to be used in conjunction with dry cleaning operations at Building 25. Varsol™, a petroleum distillate, was initially used; however, because of flammability concerns, Varsol's use was discontinued in the 1970s and was replaced with tetrachloroethene (PCE) (Baker, 1998). During this time, PCE was stored in one 150-gallon aboveground storage tank (AST) adjacent to the north wall of former Building 25, in the same vicinity as the USTs (**Figure 2-3**). Dry cleaning operations ceased in January 2004 and Building 25 was demolished in August 2004.

In 1995, OHM was contracted to remove all of the USTs associated with former Building 25. During the excavation activities, conducted between September 1995 and March 1996, OHM removed the five 750-gallon USTs adjacent to former Building 25. The UST closure activities included the disposal of approximately 140 tons of soil affected by releases of chlorinated volatile organic compounds (CVOCs) and 3,180 gallons of liquids from within the USTs (OHM, 1996). The dimensions of the five 750-gallon USTs were approximately 6- ft long by 4.5-ft in diameter, and were located approximately 1.5-ft below ground surface (bgs). The UST system information is summarized in **Table 2-1**.

Confirmation soil samples collected from the base of the excavation and each sidewall indicated the presence of CVOCs, including PCE, prompting additional excavation and soil sampling along the east wall. Additional excavation could not be conducted along the south wall because of the presence of the building (OHM, 1996). Total petroleum hydrocarbons

(TPH) were detected in the five confirmation samples at concentrations ranging from 41 to 820 milligrams per kilogram (mg/kg), which exceeded North Carolina action levels. Four temporary groundwater monitoring wells were installed in the vicinity of the UST basin and former Building 25. Laboratory analysis of soil samples collected during well installation did not detect TPH. However, TPH was detected in two of the four groundwater samples collected from the temporary wells at concentrations that exceeded the North Carolina action level. CVOCs were also detected in the groundwater samples at concentrations that exceeded the North Carolina Groundwater Quality Standards (NCGWQS) (OHM, 1996).

On May 2, 2001, UST-25 was transferred from the North Carolina Department of Environment and Natural Resources (NCDENR) UST Program to Site 88 because of the discovery of CVOc contamination in soil and groundwater in the vicinity of the former USTs. The original UST closure assessment did not utilize the current NCDENR UST Program risk-based methodologies, and a Limited Site Assessment (LSA) was not conducted for UST-25 prior to transfer to the IRP.

In 1999, a surfactant enhanced aquifer remediation (SEAR) demonstration was conducted within a 20-ft by 30-ft area at the site. The custom surfactant used in the demonstration consisted of 4% by weight (wt.) surfactant, 12% wt. isopropanol, and 0.16 to 0.19% wt. calcium chloride mixed with potable water. During the demonstration, approximately 29,700 gallons of surfactant was injected into the subsurface in the vicinity of the former UST basin, equivalent to 9,718 pounds (lbs) of surfactant, 38,637 lbs of isopropanol, and 427 lbs of calcium chloride. Over the course of the SEAR demonstration, the surfactant was continuously injected, a total of 286,000 gallons of fluid (a mixture of surfactant, dense non-aqueous phase liquid, and groundwater) were extracted, and a total of 76 gallons of PCE were removed (Duke, 2000).

Following several phases of investigation and the pilot testing of remedial technologies at Site 88, including the former UST-25 tank basin, an area of 10,000 square feet was treated using soil mixing. The treatment area included the former UST-25 tank basin and extended to a depth of approximately 20 ft bgs. The soil mixing activities utilized a 10-ft diameter auger to homogenize the soils while injecting a slurry of zero valent iron (ZVI) and bentonite clay (**Figure 2-3**) (CH2M HILL, 2008a). The ZVI created a strongly reducing environment to promote destruction of the CVOcs, while the bentonite clay facilitated uniform distribution of the iron during the mixing process and reduced the hydraulic conductivity within the treatment zone. USTs were not encountered during the soil mixing activities.

Between 2002 and 2007, a Remedial Investigation (RI) was completed at Site 88. The RI reported the presence of benzene in a groundwater sample collected from monitoring well IR88-MW30 at a concentration of 10 micrograms per liter ( $\mu\text{g/L}$ ), exceeding the NCGWQS (**Figure 2-3**). However, the RI concluded that this and other detections of petroleum hydrocarbons did not pose an unacceptable human health risk.

In June 2009, a geophysical investigation was conducted in the vicinity of former Building 25 (**Figure 2-3**) to search for the presence of anomalies indicative of a UST. An as-built drawing of former Building 25 indicated nine USTs were present at the site; however, upon excavation of the tanks, only five USTs were present. The five identified USTs were removed. The geophysical investigation was conducted to determine if any additional USTs

were present at the site. The geophysical investigation did not detect geophysical anomalies that suggested the presence of USTs (CH2M HILL, 2009).

In 2010, an in-situ chemical oxidation (ISCO) demonstration using polymer-enhanced permanganate was conducted adjacent to former UST-25 as part of the Environmental Security Technology Certification Program (ESCTP). The study included permanganate-only injections and polymer-enhanced permanganate injections for remediation of volatile organic compounds (VOCs) adjacent to the tank basin.



# Risk Characterization

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This section presents a summary of the information necessary to assign a risk classification for the site. The questionnaire format was provided in the *UST Guidelines – Appendix B* (NCDENR, 2008).

## 3.1 Groundwater/Surface Water/Vapor Impacts

### 3.1.1 High Risk

1. *Has the release contaminated any water supply well including any well used for non-drinking purposes?*

NO.

2. *Is a water supply well used for drinking water located within 1,000 ft of the source area of the release?*

**NO:** There are no water supply wells within 1,000 ft of the source area, as shown on **Figure 3-1**. The nearest active water supply well, PSW-HP652, is located 10,000 ft to the east.

3. *Is a water supply well not used for drinking water (e.g., irrigation, washing cars, industrial cooling water, filling swimming pools) located within 250 ft of the source area of the release?*

**NO:** No non-potable water supply wells are located within 250 ft of the source area.

4. *Does groundwater within 500 ft of the source area of the release have the potential for future use (there is no other source of water supply other than the groundwater)?*

**NO:** A municipal water supply is available to the area. There are no plans for water supply wells to be installed and utilized within 500 ft of the source area.

5. *Do vapors from the release pose a threat of explosion because of accumulation of the vapors in a confined space or pose other threats to public health, public safety, or the environment?*

**NO:** The location of the former USTs is an open parking lot. The maximum flame ionization detection (FID) reading from the headspace of a resealable plastic bag containing subsurface soil samples was 31.2 parts per million (ppm) and the air monitoring during soil sampling activities indicated that the explosive gas concentrations were below the lower explosive limit.

6. *Are there any other factors that would cause the release to pose an imminent danger to public health, public safety, or the environment?*

**NO:** Petroleum contaminated soil was excavated during UST removal activities in 1995 and 1996, and the site is currently capped by asphalt parking areas. CVOC-contaminated soil and groundwater are currently being addressed as part of the ongoing studies at Site 88.

### 3.1.2 Intermediate Risk

1. *Is a surface water body located within 500 ft of the source area of the release?*

**NO:** The nearest surface water body is an unnamed tributary to Beaverdam Creek, located approximately 1,050 ft northeast.

2. *Is the source area of the release located within an approved or planned wellhead protection area as defined in 42 USC 300h-7(e)?*

**NO:** The nearest wellhead protection area is located approximately 6 miles northeast of the site, according to the NCDENR Public Water Supply Well Section's Wellhead Protection Program (WHPP) Source Water Assessment Program (SWAP) website. The source area is not located within a MCB CamLej designated wellhead protection area, according to the most recent Wellhead Protection Plan- 2002 Update (AHEC, 2002).

3. *Is the release located in the Coastal Plain physiographic region as designated on a map entitled "Geology of North Carolina" published by the Department in 1985?*

**YES:** MCB CamLej is located within the Coastal Plain physiographic province.

*If YES, is the source area of the release located in an area in which there is recharge to an unconfined or semi-confined deeper aquifer that is being used or may be used as a source of drinking water?*

**NO:** The potential source area is located above the semi-confined Castle Hayne aquifer. While there is potential for recharge to the surficial and Castle Hayne aquifers, untreated groundwater is not used on MCB CamLej as drinking water. Groundwater obtained from the Castle Hayne aquifer is the raw water source for the MCB CamLej potable water treatment facilities. There is not a raw water supply well located within 10,000 ft of the potential source area.

4. *Do the levels of groundwater contamination for any contaminant exceed the gross contamination levels (GCLs) established by the Department?*

**YES:** Indeno(1,2,3-cd)pyrene was detected at an estimated concentration of 0.11 µg/L that exceeded the NCGWQS and GCL, which are both 0.05 µg/L.

## 3.2 Land Use

### 3.2.1 Property Containing Source Area of Release

1. *Does the property contain one or more primary or secondary residences (permanent or temporary)?*

**NO:** The potential source area does not contain primary or secondary residences. The nearest military barracks are located approximately 200 ft east of the former source area.

2. *Does the property contain a school, daycare center, hospital, playground, park, recreation area, church, nursing home, or other place of public assembly?*

**NO:** There are no places of public assembly located on the property.

3. *Does the property contain a commercial (e.g., retail, warehouse, office/business space, etc.) or industrial (e.g., manufacturing, utilities, industrial research and development, chemical/petroleum bulk storage, etc.) enterprise, an inactive commercial or industrial enterprise, or is the land undeveloped?*

**NO:** The property is an asphalt parking lot surrounded by landscaped areas. Military administrative offices are located in the immediate surrounding area but not in the former UST basin or former Building 25.

4. *Do children visit the property?*

**NO:** Children were not observed during the site assessment activities and, under normal circumstances, are not expected to visit the property.

5. *Is access to the property reliably restricted consistent with its use (e.g., by fences, security personnel, or both)?*

**YES:** The property/site is located within the MCB CamLej military installation. There is a minimum of one layer of security designed to prohibit trespassers or other unauthorized access to facilities on the base.

6. *Do pavements, buildings, or other structures cap the contaminated soil?*

**YES:** Petroleum contaminated soil was excavated during the UST removal and the tank basin was capped with asphalt. Additionally, CVOC-contaminated soil in the vicinity of the former UST basin was remediated through soil mixing and portions of the soil mixing zone were capped with asphalt.

*If yes, what mechanisms are in place or can be put into place to ensure that the contaminated soil will remain capped in the foreseeable future?*

Although future use cannot be reliably predicted, the site is likely to remain capped by asphalt for the foreseeable future. In addition, it is anticipated that remedial actions for Site 88 will include land use controls (LUCs) limiting soil and groundwater use within the former UST basin.

**7. *What is the zoning status of the property?***

MCB CamLej is not subject to local zoning requirements; however, the site is consistent with Industrial/Commercial properties.

**8. *Is the use of the property likely to change in the next 20 years?***

The area has historically been used for military administrative purposes and the use of the property is not likely to change in the next 20 years. Furthermore, the soil mixing resulted in unstable soils, restricting development of the site to its current use as a parking lot.

### **3.2.2 Property Surrounding Source Area of Release**

**1. *What is the distance from the source area of the release to the nearest primary or secondary residence (permanent or temporary)?***

The nearest military barracks are located approximately 200 ft east of the former source area.

**2. *What is the distance from the source area of the release to the nearest school, daycare center, hospital, playground, park, recreation area, church, nursing home, or other place of public assembly?***

The nearest place of public assembly is the Jewish Chapel located approximately 450 ft northwest of the former source area.

**3. *What is the zoning status of properties in the surrounding area?***

MCB CamLej is not subject to local zoning requirements; however, the surrounding properties are consistent with Industrial/Commercial properties.

**4. *Briefly characterize the use and activities of the land in the surrounding area.***

The surrounding area is primarily used for administrative facilities, with some barracks and training areas also located in the area.

## Receptor Information

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### 4.1 Water Supply Wells

There are no water supply wells within 1,500 ft of former UST-25 (**Figure 3-1**).

### 4.2 Public Water Supplies

There are no public water supply sources present within 1,500 ft of former UST-25. Potable water is supplied to the base by the MCB CamLej water supply system. The raw water supply for MCB CamLej and the surrounding areas is provided by water supply wells that pump groundwater from the Castle Hayne aquifer. The nearest active water supply well, PSW-HP652, is located 10,000 ft to the east.

### 4.3 Surface Water

An unnamed tributary to Beaverdam Creek is located approximately 1,050 ft to the northeast of former UST-25. The creek drains into Beaverdam Creek, which drains into Wallace Creek and, ultimately, the New River.

### 4.4 Wellhead Protection Area

Based on information provided by the North Carolina Department of Environmental Health (NCDEH) – Public Water Supply Section, as of January 2011, there are no approved wellhead protection areas with 1,500 ft of former UST-25 (NCDEH, 2011). Additionally, MCB CamLej has established wellhead protection areas in the WHPP – 2002 Update (AHEC, 2002). According to the WHPP, the site is not located within a wellhead protection area.

### 4.5 Deep Aquifers in the Coastal Plain Physiographic Region

Southeastern North Carolina and MCB CamLej are within the Tidewater region of the Atlantic Coastal Plain physiographic province. Within the MCB CamLej area, approximately 1,500 ft of sediment overlies the basement rock. These sediments contain seven aquifers and their associated confining units and include the Surficial, Castle Hayne, Beaufort, Peedee, Black Creek, and Upper and Lower Cape Fear aquifers (Cardinell, et al., 1993).

Data were obtained from boring logs and cross-sections developed as part of the IRP Site 88 investigations. Aquifers in the vicinity of the source area are summarized on **Table 4-1**.

TABLE 4-1  
 Deep Aquifers of the Coastal Plain  
*Former UST-25 Phase I LSA Report*  
*MCB CamLej, North Carolina*

Hydrogeologic Unit	Approximate Depth Interval (ft bgs)
Surficial aquifer	8 to 20
Castle Hayne Confining Unit	20 to 35
Castle Hayne Aquifer	35 to 175
Beaufort Confining Unit	175 to 185
Beaufort Aquifer	185

The nearest area of groundwater discharge downgradient from the site is the New River, located 2,900 ft west of the source area.

## 4.6 Subsurface Structures

Subsurface utilities, including water and sewer pipes, are located in the vicinity of the source area. There were no basement structures observed in the surrounding area. The threat of explosion due to the accumulation of vapors from an underground contaminant source to a confined space is not likely based on explosive gas measurements obtained during soil sampling.

## 4.7 Property Owners and Occupants

Table 4-2 lists the property owner and occupant information.

TABLE 4-2  
 Property Owners and Occupants  
*Former UST-25 Phase I LSA Report*  
*MCB CamLej, North Carolina*

Tax Parcel Number	Owner/Occupant Name	Address
Unknown – 236 square miles of land within MCB CamLej	Commanding General – MCB CamLej, NC	I&E/EMD/EQD PSC 20004 MCB Camp Lejeune, NC 28542

# Geology and Hydrogeology

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## 5.1 Site Geology

Site-specific geological information was obtained during the installation of monitoring well IR88-MW31, constructed within the former UST-25 basin. The soil boring log and well completion diagram for monitoring well IR88-MW31 are included as **Appendix A**.

Shallow soils of the undifferentiated formation near the source area consist of mostly fine silt to approximately 18 ft bgs underlain by a clayey silt layer of the Belgrade Formation. In the vicinity of former UST-25, this clayey silt layer extends to approximately 30 ft bgs. The River Bend and Castle Hayne Formations (Fms) are located below this layer and consist of fine to medium-grained sands with intermittent beds of partially cemented and shelly sand to approximately 180 ft bgs. A laterally continuous clay layer, approximately 10 ft thick, is encountered below the Castle Hayne Fm.

## 5.2 Site Hydrogeology

Investigations of Site 88 and UST-25 have focused upon the surficial aquifer and underlying Castle Hayne aquifer which occur within the shallow deposits of the undifferentiated formation, and the River Bend and Castle Hayne Formations, respectively. These aquifers are occasionally separated by a discontinuous layer of clayey silt that occurs at a depth of roughly 20 to 25 ft bgs and pinches out to the west of UST-25. The presence of this fine grained layer beneath the former footprint of Building 25 inhibits downward movement of groundwater.

The soil mixing activities introduced ZVI and bentonite clay that significantly reduced the hydraulic conductivity of the soils within the former UST-25 tank basin to approximately 0.013 feet per day (ft/day) (AGVIQ/CH2M HILL, 2006). Laboratory testing of undisturbed soil samples collected from the clayey silt aquitard yielded vertical hydraulic conductivity values of  $1.3 \times 10^{-4}$  ft/day (CH2M HILL, 2008a).

During the November through December 2010 field event, the depth to water in IR88-MW31 was between 17.64 and 17.70 ft above mean sea level (amsl). Groundwater flow within the surficial aquifer is generally toward the southwest. Groundwater flow in the Castle Hayne aquifer is generally to the west, northwest.

# Sampling Results

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The Phase I LSA investigation included collection of a groundwater sample from existing well IR88-MW31 and installation of one soil boring immediately adjacent to monitoring well IR88-MW31, within the former UST-25 tank basin, as shown on **Figure 2-3**. Analytical results from the Phase I LSA activities are discussed as follows.

## 6.1 Soil Sampling

The soil boring location was selected to evaluate subsurface soil conditions within the former UST basin. On December 13, 2010, one subsurface soil sample (UST25-SB01-4-5-10D) was collected using a stainless steel hand auger from a depth of 4 to 5 ft bgs. This sample interval was selected because it was approximately one foot above the water table (6.42 ft bgs), as measured in monitoring well IR88-MW31.

The soil sample was analyzed by the following laboratory methods:

- VOCs (United States Environmental Protection Agency [USEPA] Method 8260)
- Semi-volatile organic compounds (SVOCs) (USEPA Method 8270)
- Volatile petroleum hydrocarbons (Massachusetts Department of Environmental Protection [MADEP] VPH)
- Extractable petroleum hydrocarbons (MADEP EPH)

A portion of the sample, intended for VOC analysis, was field preserved by field preparation method 5035 to limit volatilization of VOCs. The remaining soil sample was placed into a stainless steel bowl, homogenized, and then transferred into the appropriate bottleware. The soil samples were placed into an ice-filled sample cooler, accompanied by chain-of-custody, and shipped by overnight courier to Katahdin Analytical Services in Scarborough, Maine.

### 6.1.1 Soil Analytical Results

A summary of analytes detected in the soil sample is presented in **Table 6-1** (modified from NCDENR UST Table B-3). The complete analytical laboratory report is presented in **Appendix C**. To determine the risk classification, the analytical results were compared to the Soil-to-Groundwater Maximum Soil Contamination Concentrations (MSCCs), the Industrial/Commercial MSCCs, and the Residential MSCCs specified in Table 4 of the UST *Guidelines* (NCDENR, 2008, 2010a).

Seventeen VOCs were detected in the soil sample, of which three were detected at concentrations exceeding their respective Soil-to-Groundwater MSCC. The concentrations of benzene (17 J micrograms per kilogram [ $\mu\text{g}/\text{kg}$ ]), PCE (25,000 J  $\mu\text{g}/\text{kg}$ ), and trichloroethene (TCE) (29 J  $\mu\text{g}/\text{kg}$ ) exceeded their respective Soil-to-Groundwater MSCCs. Additionally, the concentration of PCE exceeded the Residential MSCC and the Industrial/Commercial MSCCs. No petroleum-related hydrocarbons were detected at concentrations exceeding their respective Industrial/Commercial MSCCs.



Sixteen SVOCs were detected in the soil sample; however, none of the detected concentrations of SVOCs exceeded their respective MSCCs.

One EPH fraction (C9-C18 aliphatics) and one VPH fraction (C9-C22 aromatics) were detected in the soil sample at concentrations of 140,000 and 130,000 µg/kg, respectively. Only the concentration of C9-C22 aromatics fraction exceeded the Soil-to-Groundwater MSCC (31,000 µg/kg). None of the detected concentrations of EPH or VPH exceeded their respective Industrial/Commercial or Residential MSCCs.

## 6.2 Groundwater Sampling

One groundwater sample was collected from monitoring well IR88-MW31 on November 30, 2010 (**Figure 2-3**). This monitoring well is located immediately adjacent to the former tank basin. Well construction information for IR88-MW31 is summarized in **Table 6-2**, and the well completion diagram is included in **Appendix A**.

The monitoring well was purged and sampled using low flow sampling methodology. A submersible bladder pump equipped with new ¼-inch inner diameter (ID) polyethylene tubing was placed at the midpoint of the well screen and operated until water quality parameters including pH, temperature, oxidation-reduction potential (ORP), turbidity, and conductivity stabilized. The water quality parameters were monitored using a calibrated YSI 556 multi-parameter system with a flow-through cell and recorded on groundwater sampling data sheets (**Appendix B**). A summary of groundwater quality parameters are shown on **Table 6-3**.

Following purging, groundwater samples were collected for laboratory analysis of:

- VOCs (USEPA Method 8260),
- SVOCs (USEPA Method 8270)
- MADEP VPH, and
- MADEP EPH

The groundwater samples were placed in laboratory-supplied bottleware, then placed into an ice-filled cooler, were accompanied by chain-of-custody, and shipped via Federal Express to Katahdin Laboratories in Scarborough, Maine.

### 6.2.1 Groundwater Analytical Results

A summary of analytes detected in the groundwater sample collected from well IR88-MW31 is presented on **Table 6-4**. The complete analytical laboratory report is included as **Appendix C**.

Four VOCs (benzene, ethylbenzene, total xylenes, and toluene) and five SVOCs (2-methylnaphthalene, di-n-butylphthalate, fluorene, indeno(1,2,3-cd)pyrene, and naphthalene), were detected in the groundwater sample collected from IR88-MW31. Benzene was detected at a concentration (120 µg/L), exceeding the NCGWQS of 1 µg/L, but below the applicable GCL of 5,000 µg/L. Indeno(1,2,3-cd)pyrene exceeded the NCGWQS and GCL of 0.05 µg/L.

One EPH (C9-C12 aliphatics) and two VPH fractions (C5-C8 aliphatics and C9-C10 aromatics) were detected in the groundwater sample. The C9-C12 aliphatics concentration, C5-C8 aliphatics, and C9-C22 aromatics exceeded their respective NCGWQS.

### **6.3 Free Product Investigation/Recovery**

Free product was not detected in monitoring well IR88-MW31.

### **6.4 Investigation-derived Waste Management**

Investigation-derived waste (IDW) generated during the LSA field activities was containerized in Department of Transportation (DOT)-approved 55-gallon steel drums and staged at the temporary storage facility located at Mainside on MCB CamLej. A licensed IDW contractor transported the IDW to an approved waste facility for disposal.

# Conclusions and Recommendations

---

## 7.1 Conclusions

Based on the results of this Phase I LSA for the former UST-25 tank basin, the following conclusions are presented:

- There are no water supply wells within 1,500 ft of UST-25.
- Potable water throughout the base is supplied by the MCB CamLej Public Works Department.
- The former UST-25 tank basin is not located in a designated wellhead protection area.
- No surface water bodies are located within 500 ft of the source area.
- The site should be classified as Industrial/Commercial land use.
- Three VOCs (benzene, PCE, and TCE) were detected in soil samples at concentrations exceeding their respective Soil-to-Groundwater MSCC. PCE was the only VOC reported to exceed its respective Industrial/Commercial and Residential MSCC (10,000 µg/kg) at a concentration of 25,000 J µg/kg.
- Petroleum-related hydrocarbons were not detected in the subsurface soil sample at concentrations above Industrial/Commercial and Residential MSCCs. Only the C9-C22 aromatics fraction exceeded the Soil-to-Groundwater MSCC (31,000 µg/kg).
- Benzene was detected in groundwater above the NCGWQS, but below the GCL of 5,000 µg/L. Indeno(1,2,3-cd)pyrene was detected at an estimated concentration (0.11 J µg/L) that exceeded the NCGQWS and GCL of 0.05 µg/L.
- C9-C18 aliphatics, C5-C8 aliphatics, and C9-C22 aromatic hydrocarbon fractions detected in groundwater exceeded the NCGWQSS.
- The CVOCs (PCE, TCE and daughter products) are being addressed through the IRP at Site 88 where a pilot study is currently being conducted and the final remedial action is planned to be in-place in 2014.

## 7.2 Recommendations

Based on the detection of indeno(1,2,3-cd)pyrene above the GCL at an estimated concentration of 0.11 J µg/L, the site does not qualify for low risk classification. It is recommended that additional groundwater samples be collected for analysis of SVOCs in one year. Upon completion of the additional sample collection, the risk classification of the site can be reevaluated.

## SECTION 8

# References

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## Figures

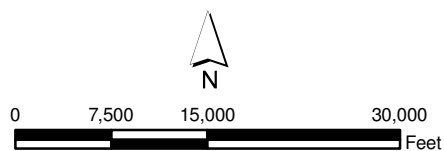
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#### Legend

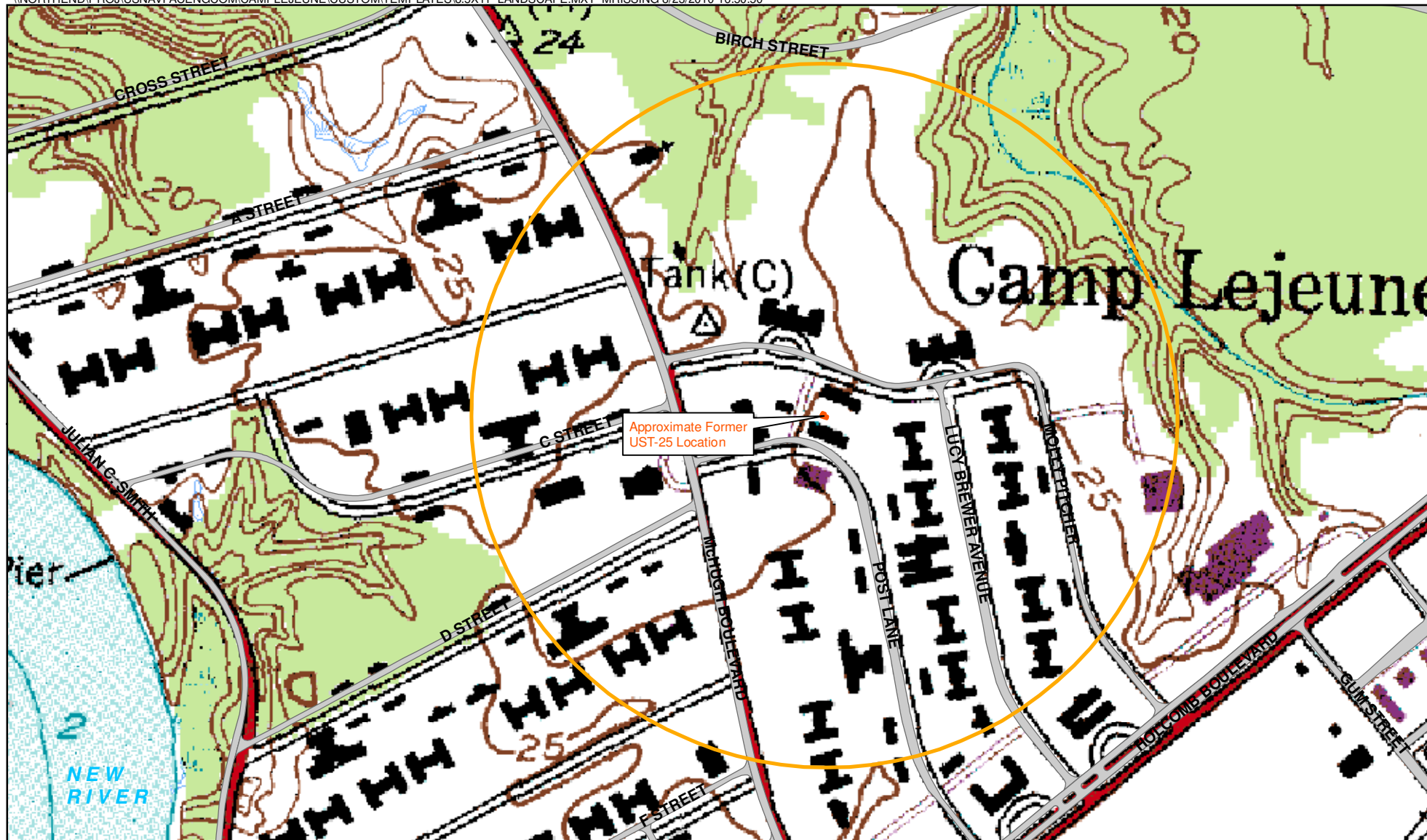
- Highways
  - IR Site 88 Boundary
  - Installation Boundary
- 2006 Aerial Imagery



1 inch = 15,000 feet

Figure 2-1  
Base Location Map  
Former UST-25 Phase I LSA Report  
MCB CamLej  
North Carolina





#### Legend

- UST Excavation Area
- 1,500 foot Radius
- Wetlands

Topo Source: USGS 7.5 min  
 Quad of Jacksonville South, N.C  
 Photo inspected in 1988  
 Elevation in feet above mean sea level  
 5 - foot contour interval

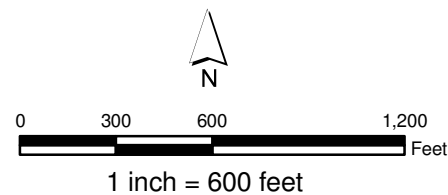


Figure 2-2  
 Topographic Site Location Map  
 Former UST-25 Phase I LSA Report  
 MCB CamLej  
 North Carolina





- Legend**
- Soil Sample Location
  - ⊕ Monitoring Well
  - Steam Line
  - Storm Sewer Utility Line
  - Wastewater Utility Line
  - Water Utility Line
  - Former Building 25
  - Soil Mixing Area
  - ▭ UST Excavation Area
  - ▭ Geophysical Survey Area
  - ▭ Former UST Locations
  - ▭ IR Site 88 Boundary

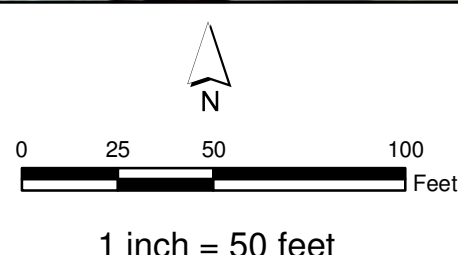


Figure 2-3  
Site Map  
Former UST-25 Phase I LSA Report  
MCB CamLej  
North Carolina



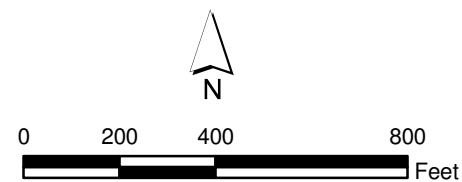


**Legend**

- Surface Water Centerline
- Surface Water Body Area
- Jurisdictional Wetland Area
- 1,500 foot Radius
- 1,000 foot Radius
- 500 foot Radius

**Land Use Area**

- Administrative Facilities
- Hospital and Medical Facilities
- Research, Development and Test Facilities
- Housing and Community Facilities
- Operational and Training Facilities
- Supply Facilities
- Utilities and Ground Improvements



1 inch = 400 feet

Figure 3-1  
Land Use and Receptor Survey Map  
Former UST-25 Phase I LSA Report  
MCB CamLej  
North Carolina



**Tables**

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TABLE 2-1  
UST System and Site History  
*Former UST-25 Phase I LSA Report*  
*MCB CamLej, North Carolina*

UST ID Number	Previous Content	Capacity (gallons)	Construction Details	Tank Dimensions (feet)	Description of Associated Piping and Pumps	Date tank installed	Status of UST	Release associated with the UST?
UST-25-1 through 5	Varsol™	750	Steel	6 x 4.5	Piping to building has been removed	1940s	Removed 1995-1996	Yes

**TABLE 6-1**  
Soil Analytical Results  
*Former UST-25 Phase I LSA Report*  
MCB CamLej, North Carolina

Sample ID	Soil-to-Groundwater MSCC	Residential MSCC	Industrial/ Commerical MSCC	UST25-SB01-4-5-10D
Sample Date				12/13/10
Chemical Name				
<b>Volatile Organic Compounds (µg/kg)</b>				
1,2-Dichlorobenzene	230	1,400,000	36,000,000	7.8 J
1,3,5-Trimethylbenzene	8,300	782,000	20,440,000	770 J
1,4-Dichlorobenzene	99	110,000	1,000,000	2.8 J
2-Butanone	NS	NS	NS	40 J
Acetone	24,000	14,000,000	360,000,000	340 J
Benzene	5.6	18,000	164,000	<b>17 J</b>
cis-1,2-Dichloroethene	350	156,000	4,000,000	2.1 J
Ethylbenzene	4,900	1,560,000	40,000,000	10 J
Isopropylbenzene	1,700	1,564,000	40,880,000	41 J
m- and p-Xylene	4,600	3,129,000	81,760,000	21 J
n-Butylbenzene	4,300	626,000	16,350,000	88 J
o-Xylene	4,600	3,129,000	81,760,000	40 J
sec-Butylbenzene	3,300	626,000	16,350,000	170 J
tert-Butylbenzene	3,400	626,000	16,350,000	32 J
Tetrachloroethene	7.4	1,100	10,000	<b><u>25,000 J</u></b>
Toluene	4,300	1,200,000	32,000,000	16 J
Trichloroethene	19	4,600	120,000	<b>29 J</b>
<b>Semivolatile Organic Compounds (µg/kg)</b>				
1,2,4-Trimethylbenzene	8,500	782,000	20,440,000	480 J
2-Methylnaphthalene	3,600	63,000	1,635,000	22 J
Acenaphthene	8,200	940,000	24,000,000	12 J
Acenaphthylene	11,000	469,000	12,264,000	1.9 J
Benzo(a)anthracene	350	880	8,000	9.9 J
Benzo(a)pyrene	96	88	780	7 J
Benzo(b)fluoranthene	1,200	880	8,000	12 J
Benzo(g,h,i)perylene	6,400,000	469,000	12,264,000	5.8 J
Benzo(k)fluoranthene	12,000	9,000	78,000	3.9 J
Chrysene	39,000	88,000	780,000	2.9 J
Fluoranthene	290,000	620,000	16,400,000	24
Fluorene	47,000	620,000	16,400,000	13 J
Indeno(1,2,3-cd)pyrene	3,400	880	8,000	5.2 J
Naphthalene	160	313,000	8,176,000	17 J
Phenanthrene	56,000	469,000	12,264,000	34
Pyrene	270,000	469,000	12,264,000	24
<b>VPH/EPH (µg/kg)</b>				
Aliphatics C9-C12	540,000	1,500,000	40,000,000	140,000
Aliphatics C9-C18				75,000 U
Aromatics C9-C10	31,000	469,000	12,264,000	<b>130,000</b>
Aromatics C11-C22				18,000 U

**Notes:**  
**Bold text indicates exceedance of Soil-to-Groundwater MSCC**  
Underlined text indicates exceedance of Residential MSCC  
**Bold box indicates exceedance of Industrial/Commercial MSCC**  
J - Analyte present, value may or may not be accurate or precise  
U - The material was analyzed for, but not detected  
µg/kg - Micrograms per kilogram  
VPH - volatile petroleum hydrocarbons  
EPH - extractable petroleum hydrocarbons  
NS - Not specified

TABLE 6-2  
 Monitoring Well Construction Details  
*Fomer UST- 25 Phase I LSA Report*  
*MCB Cam Lej, North Carolina*

Monitoring Well ID	Date Installed	Date Water Level Measured	Casing Diameter (inches)	Screened Interval (ft bgs)	TOC Elevation (ft amsl)	Well Depth (ft bgs)	Depth to water (ft btoc)	Water Elevation (ft amsl)
IR88-MW31	10/13/2005	12/13/2010	2	3 to 18	24.95	18	7.31	17.64

Notes:  
 ft amsl - feet above mean sea level  
 ft bgs - feet below ground surface  
 ft btoc - feet below top of casing

TABLE 6-3

Water Quality Measurements

Former UST-25 Phase I LSA Report

MCB CamLej, North Carolina

Monitoring Well ID	Date Sampled	Depth to Water (ft btoc)	TOC Elevation (ft amsl)	Water Elevation (ft amsl)	pH (SU)	Conductivity (mS/cm)	Dissolved Oxygen (mg/L)	Temperature (°Celsius)	Turbidity (NTU)	ORP (mV)
IR88-MW31	11/30/2010	7.25	24.95	17.70	8.69	4.37	0.99	25.27	12.7	-278.2

Notes:

ft - feet

btoc - below top of casing

SU - standard units

mS/cm - miliSiemens per centimeter

mg/L - milligram per liter

NTU - nephelometric turbidity units

mV - millivolts

TABLE 6-4  
 Groundwater Analytical Results  
 Former UST-25 Phase I LSA Report  
 MCB CamLej, North Carolina

Station ID	NCGWQS (January, 2010) *	GCL	IR88-MW31
Sample ID			IR88-GW31-10D
Sample Date			11/30/10
Chemical Name			
<b>Volatile Organic Compounds (µg/l)</b>			
Benzene	1	5,000	120
Ethylbenzene	600	84,500	7.3
m- and p-Xylene	500	85,500	14
o-Xylene	500	85,500	27
Toluene	600	260,000	44
<b>Semivolatile Organic Compounds (µg/l)</b>			
2-Methylnaphthalene	30	12,500	1.4 J
Di-n-butylphthalate	700	NS	8.8
Fluorene	300	990	0.16 J
Indeno(1,2,3-cd)pyrene	0.05	0.05	<b>0.11 J</b>
Naphthalene	6	6,000	7.2 J
<b>VPH/EPH (µg/l)</b>			
Aliphatics C5-C8	400	NS	50,000
Aliphatics C9-C12	700	NS	1,200 J
Aliphatics C9-C18			75 U
Aliphatics C19-C36			75 U
Aromatics C9-C10	200	NS	2,500
Aromatics C11-C22			75 U

**Notes:**  
 NCGWQS - North Carolina Groundwater Quality Standard  
 GCL - Gross Contamination Levels  
**Bold box indicates exceedance of NC2L or the more conservative MCL**  
**Bold text indicates exceedance of GCL**  
 J - Analyte present, value may or may not be accurate or precise  
 U - The material was analyzed for, but not detected  
 µg/l - Micrograms per liter  
 \* - The MCL-Groundwater value is reported in place of the NCGWQS where the MCL value is more conservative.  
 NS - Not specified

Appendix A  
Soil Boring Log & Well Completion Diagram



**CH2MHILL**

PROJECT NUMBER: 180555.FI.MW

BORING NUMBER: 88-MW31

Sheet: 1 of 1

**SOIL BORING LOG**

PROJECT: RI 88/CTO-026/MW Installation

LOCATION: MCB Camp Lejeune, NC

ELEVATION: \_\_\_\_\_

DRILLING CONTRACTOR: Parratt Wolff

DRILLING METHOD AND EQUIPMENT: HSA CME-75

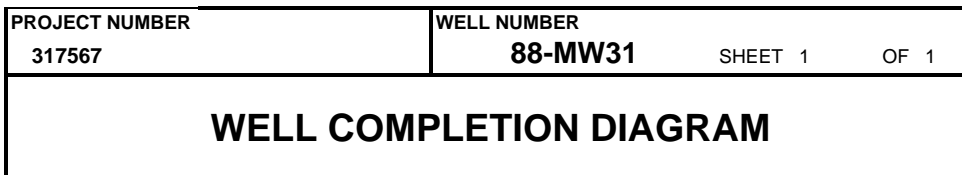
WATER LEVELS: \_\_\_\_\_

START: 10/13/05

FINISH: \_\_\_\_\_

LOGGER: D. Dry

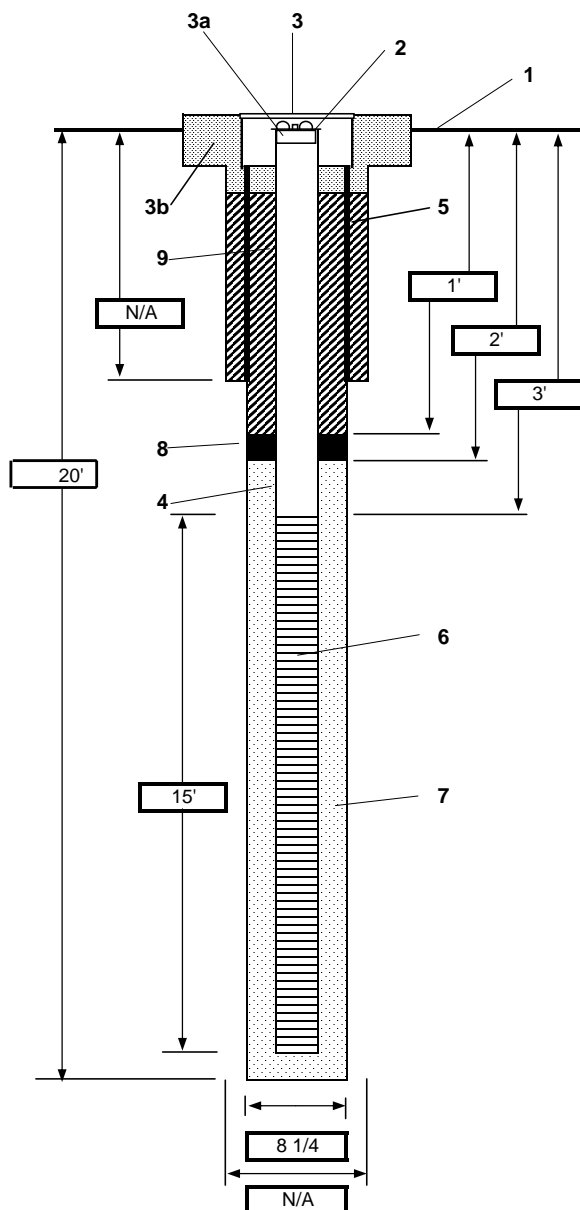
DEPTH BELOW	SAMPLE			STANDARD PENETRATION TEST RESULTS	SOIL DESCRIPTION	COMMENTS
	INTERVAL	NUMBER AND	RECOVERY (FT)	6"-6"-6" (N)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS AND INSTRUMENTATION
0					Ground Surface	PID/FID (ppm)
5	5.0 7.0		2	5-7-6 (13)	<u>Silt</u> (ML), Uniform mixed material, dark green gray, damp, firm	VOC @ 1425 295/2,147 Air monitoring at background
10	10.0 12.0		2	1-2-2 (4)	At 10 ft., Moist, soft with tan inclusions	VOC @ 1440 2,027/7,490
15	15.0 17.0		2	1-1-2 (3)	At 15 ft, Wet, soft	VOC @ 1450 1,409/3,460 Air monitoring at 0/0.5 ppm above background, VC detector tube =0.0 ppm
20	18.0 20.0		2	2-1-3 (4)	<u>Clay</u> (CH), Dark brown, soft, plastic, moist	VOC @ 1510 55/272
25					End of Boring at 20.0'	VOC soil samples collected at 5, 10, 15 and 20 feet bgs, analysis by compuchem
30						



LOCATION : MCB Camp Lejeune, NC

DRILLING METHOD AND EQUIPMENT USED : 4 1/4 HSA CME-75

WATER LEVELS : START : 10/13/2005 END : 10/13/2005 LOGGER : David Dry



- |                                   |                             |
|-----------------------------------|-----------------------------|
| 1- Ground elevation at well       | 25.34'                      |
| 2- Top of casing elevation        | 24.95'                      |
| 3- Wellhead protection cover type | 8" steel flush mount        |
| a) locking expansion plug         | yes                         |
| b) concrete pad dimensions        | 2'x2'                       |
| 4- Dia./type of well casing       | 2" Schedule 40 PVC          |
| 5- Dia./type of surface casing    | N/A                         |
| 6- Type/slot size of screen       | 0.010" slot Schedule 40 PVC |
| 7- Type screen filter             | # 1 sand                    |
| a) Quantity used                  |                             |
| 8- Type of seal                   | Bentonite Holeplug          |
| a) Quantity used                  |                             |
| 9- Grout                          |                             |
| a) Grout mix used                 | Concrete to surface         |
| b) Method of placement            | Pour                        |
| c) Vol. of surface casing grout   |                             |
| d) Vol. of well casing grout      |                             |
| Development method                |                             |
| Development time                  |                             |
| Estimated purge volume            |                             |

Comments Collected Draeger Tube for vinyl chloride during drilling (0.0 ppm)



**Appendix B**  
**Groundwater Sampling Data Sheet**

---



Client:	NAVFAC Mid-Atlantic	Project Number:	408943.FI.FS
Location:	MCB CAMP LEJEUNE	Well ID:	1R88-MW31
Event:	CTO-WE31 SITES	Sample ID:	1R88-GW31-10D
Date:	11/30/10	Sampling Team:	V. Cunningham/RDU
Weather:	70s, partly cloudy, breezy		

Total Depth:	<u>18</u>	FT.(BTOC)
Depth to water:	<u>(-) 7.25</u>	FT.(BTOC)
Water Column:	<u>10.75</u>	FT.
	<u>(X) 0.1163</u>	GAL/FT.
Well Volume:	<u>1.25</u>	GAL. X 3 = 5.25
Total Purge Vol.:	<u>5.5</u>	GAL.

Purge Device: bladder pump

Measuring Device: YSI 356 # 13074  
Hanna # 09010  
 Date and Time: See table below

Well Dia. (inches)	Volume (gallons/foot)
0.75	0.023
1	0.041
2	0.163
4	0.653
6	1.469

[illegible]

Date: 11/30/10	Temp. °C	Cond. mS/cm	DO mg/L	pH SU	ORP mV	Turbidity NTU	Other: _____	Color / Odor / Comments
Time: 1515								
Method: low-flow	25.27	4.370	0.99	8.69	-278.2	12.7		

Sample information: method, container number, size, and type, preservative used.

Analysis	Preservative	Container requirements	No. of containers
VOCs	HCL	✓ 3x 40 mL VOAs	3
SVOCs (EPA 8270D)	NA	✓ 2x 1 Liter Ambers	<del>2</del> (vc)
MADEP VPH	HCL	✓ 3x 40 mL VOAs	2
MADEP EPH	HCL	✓ 2x 1 Liter Ambers	2
EPA 625 BNA + 10 TICS	NA	✓ 2x 1 Liter Ambers	✓ 2
LEAD & CHROMIUM	HNO3	✓ 1x 250 mL or 500 mL Poly	—

Observations/Notes:
---------------------

Total Volume Purged:

5.5 gal pump set @ 131  
pump started @ 1326

FID: 0.0 ppm  $Q = 350 \text{ mL/min}$   
slight odor when opened

MS/MSD: YES

NO

MS ID:

SD ID:

Duplicate: YES

(NO)

Duplicate ID:

Signature(s):

Verd Ana Cingh

bladder had dark substance in bottom when H<sub>2</sub>O set removed pump @ 15', stopped pump @ 1435 to

0 ml/min  
pened  
before  
recharge

Appendix C  
Soil and Groundwater Analytical Laboratory  
Reports and Chain-of-Custody Forms

---



Client <u>07201 HILL</u>		Contact <u>REBECCA SHAW</u>	Phone # <u>(757) 671-6248</u>	Fax # <u>( )</u>
Address <u>3225 57TH CLEVELAND ST</u>		City <u>LA BEACH</u>	State <u>VA</u>	Zip Code <u></u>
Purchase Order # <u></u>		Proj. Name / No. <u>OTO-WES1 / 408143 SITS</u>		Katahdin Quote # <u></u>
Bill (if different than above) <u></u>		Address <u></u>		
Sampler (Print / Sign) <u>REBECCA SHAW</u>		Copies To: <u>REBECCA SHAW</u>		

LAB USE ONLY	WORK ORDER #:	ANALYSIS AND CONTAINER TYPE PRESERVATIVES									
	KATAHDIN PROJECT NUMBER <u></u>	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.
		Y	N	Y	N	Y	N	Y	N	Y	N
REMARKS: <u></u>											
SHIPPING INFO: <input checked="" type="checkbox"/> FED EX <input type="checkbox"/> UPS <input type="checkbox"/> CLIENT											
AIRBILL NO: <u></u>											
TEMP °C <u></u> <input type="checkbox"/> TEMP BLANK <input type="checkbox"/> INTACT <input type="checkbox"/> NOT INTACT											

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	MADEP EPH	EPA 625 B/A + 10% C	TOTAL Pb + Cr 303DC PREP	DSS. Pb + Cr 303DC PREP
	U57817-GND1-10D	12/1 / 1135	AG	6	✓	✓	✓	✓
	U57817-GND1-1AD-MS	12/1 / 1135	AG	6	✓	✓	✓	✓
	U57817-GND1-10D-SD	12/1 / 1135	AG	4		✓	✓	✓
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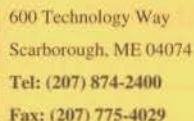
  

COMMENTS FLDCX AIRBILL 8726 1548 5537

Relinquished By: (Signature) <u>[Signature]</u>	Date / Time <u>12/1</u>	Received By: (Signature) <u></u>	Relinquished By: (Signature) <u></u>	Date / Time <u></u>	Received By: (Signature) <u></u>
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PLEASE BEAR DOWN AND  
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Page 1 of 1

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN SERVICES, EXCEPT WHEN A SIGNED CONTRACTUAL AGREEMENT EXISTS.

**CUSTOMER COPY**



# CHAIN of CUSTODY

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Page 1 of 1

Client <u>CH2M HILL</u>		Contact <u>REBEKHA SHAW</u>	Phone # <u>(757) 671-6248</u>	Fax # <u>( )</u>
Address <u>5700 CLEVELAND ST</u>		City <u>VA BEACH</u>	State <u>VA</u>	Zip Code <u></u>
Purchase Order # <u></u>	Proj. Name / No. <u>CDWKE31 / 408943.F1.F5</u>		Katahdin Quote # <u></u>	

Bill (if different than above) <u></u>	Address <u></u>
Sampler (Print / Sign) <u>VERA ANNA CUNNINGHAM / [Signature]</u>	
Copies To: <u>P. SHAW</u>	

LAB USE ONLY		ANALYSIS AND CONTAINER TYPE PRESERVATIVES											
WORK ORDER #:		Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.	Filt.
KATAHDIN PROJECT NUMBER <u></u>		Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
REMARKS: <u></u>													
SHIPPING INFO: <input checked="" type="checkbox"/> FED EX <input type="checkbox"/> UPS <input type="checkbox"/> CLIENT													
AIRBILL NO: <u></u>													
TEMP °C <u></u> <input type="checkbox"/> TEMP BLANK <input type="checkbox"/> INTACT <input type="checkbox"/> NOT INTACT													
*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	MADEP EPH	EPA 625 BVA-10 TICs	TOTAL Pb + Cr EPA 30306	Diss. Pb + Cr EPA 30306					
	US1817-GW01-10D-SD	2/1 / 1135	AQ	2	✓								
	IR88-GW31-10D	11/30 / 1515	AQ	4	✓	✓	Ⓟ	Ⓟ					
	IR78-GW09-1-10D	11/30 / 1725	AQ	Ⓟ 46	✓	✓	✓	✓					
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COMMENTS <u>Fed ex # : <del>255</del> 8726 1548 5537</u>					
Relinquished By: (Signature) <u>[Signature]</u>	Date / Time <u>2/1 / 1000</u>	Received By: (Signature) <u></u>	Relinquished By: (Signature) <u></u>	Date / Time <u></u>	Received By: (Signature) <u></u>
Relinquished By: (Signature) <u></u>	Date / Time <u></u>	Received By: (Signature) <u></u>	Relinquished By: (Signature) <u></u>	Date / Time <u></u>	Received By: (Signature) <u></u>



# CHAIN of CUSTODY

PLEASE BEAR DOWN AND  
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Page 1 of 1

Client <u>CH2M HILL</u>		Contact <u>REBEKAH SHAW</u>	Phone # <u>(757) 671-6248</u>	Fax # <u>( )</u>
Address <u>5700 CLEVELAND ST</u>		City <u>VA BEACH</u>	State <u>VA</u>	Zip Code <u></u>
Purchase Order # <u></u>		Proj. Name / No. <u>CTD-WE31 / 408943.FIFS</u>		Katahdin Quote # <u></u>
Bill (if different than above) <u></u>		Address <u></u>		

Sampler (Print / Sign) <u>VERD ANNA CUNNINGHAM</u>	Copies To: <u>R. SHAW</u>
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LAB USE ONLY	WORK ORDER #:	ANALYSIS AND CONTAINER TYPE PRESERVATIVES									
	KATAHDIN PROJECT NUMBER <u></u>										
REMARKS: <u></u>											
SHIPPING INFO: <input checked="" type="checkbox"/> FED EX <input type="checkbox"/> UPS <input type="checkbox"/> CLIENT											
AIRBILL NO: <u></u>											
TEMP °C <u></u> <input type="checkbox"/> TEMP BLANK <input type="checkbox"/> INTACT <input type="checkbox"/> NOT INTACT											

* Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Filt. <input type="checkbox"/> Y <input type="checkbox"/> N	Filt. <input type="checkbox"/> Y <input type="checkbox"/> N	Filt. <input type="checkbox"/> Y <input type="checkbox"/> N	Filt. <input type="checkbox"/> Y <input type="checkbox"/> N	Filt. <input type="checkbox"/> Y <input type="checkbox"/> N	Filt. <input type="checkbox"/> Y <input type="checkbox"/> N	Filt. <input type="checkbox"/> Y <input type="checkbox"/> N	Filt. <input type="checkbox"/> Y <input type="checkbox"/> N	Filt. <input type="checkbox"/> Y <input type="checkbox"/> N	Filt. <input type="checkbox"/> Y <input type="checkbox"/> N	Filt. <input type="checkbox"/> Y <input type="checkbox"/> N
<u>WE31-FB113010-10D</u>	<u>11/30 / 1635</u>	<u>AG</u>	<u>5</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>					
<u>WE31-FB120110-10D-GW</u>	<u>12/1 / 1545</u>	<u>AG</u>	<u>5</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>	<u>✓</u>					
<u>IR84-GW17-10D</u>	<u>12/1 / 1445</u>	<u>AG</u>	<u>5</u>					<u>✓</u>	<u>✓</u>					
<u>IR78-GW09-10-10D</u>	<u>11/30 / 1730</u>	<u>AG</u>	<u>5</u>					<u>✓</u>	<u>✓</u>					
<u>UST1817-GW01-10D-MS</u>	<u>12/1 / 1135</u>	<u>AG</u>	<u>5</u>					<u>✓</u>	<u>✓</u>					
<u>UST1817-GW01-10D-SD</u>	<u>12/1 / 1135</u>	<u>AG</u>	<u>5</u>					<u>✓</u>	<u>✓</u>					
<u>UST1817-GW01-10D</u>	<u>12/1 / 1135</u>	<u>AG</u>	<u>5</u>					<u>✓</u>	<u>✓</u>					
<u>IR88-GW31-10D</u>	<u>11/30 / 1515</u>	<u>AG</u>	<u>5</u>					<u>✓</u>		<u>✓</u>				
<u>IR78-GW09-1-10D</u>	<u>11/30 / 1725</u>	<u>AG</u>	<u>5</u>					<u>✓</u>	<u>✓</u>					
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Relinquished By: (Signature) <u>[Signature]</u>	Date / Time <u>12/1 / 1600</u>	Received By: (Signature) <u></u>	Relinquished By: (Signature) <u></u>	Date / Time <u></u>	Received By: (Signature) <u></u>
Relinquished By: (Signature) <u></u>	Date / Time <u></u>	Received By: (Signature) <u></u>	Relinquished By: (Signature) <u></u>	Date / Time <u></u>	Received By: (Signature) <u></u>

## Report of Analytical Results

**Client:** CH2MHill  
**Lab ID:** SD7472-10  
**Client ID:** IR88-GW31-10D  
**Project:** MCB Camp Lejeune CTO-WI  
**SDG:** WE31-1

**Sample Date:** 30-NOV-10  
**Received Date:** 02-DEC-10  
**Extract Date:** 09-DEC-10  
**Extracted By:** TTC  
**Extraction Method:** SW846 8260B  
**Lab Prep Batch:** WG86093

**Analysis Date:** 09-DEC-10  
**Analyst:** TTC  
**Analysis Method:** SW846 8260B  
**Matrix:** AQ  
**% Solids:** NA  
**Report Date:** 04-JAN-11

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Toluene		44.	ug/L	1	1	1.0	0.27	0.50
Benzene		120	ug/L	1	1	1.0	0.26	0.50
Ethylbenzene		7.3	ug/L	1	1	1.0	0.21	0.50
m+p-Xylenes		14.	ug/L	1	2	2.0	0.59	1.0
o-Xylene		27.	ug/L	1	1	1.0	0.25	0.50
Dibromofluoromethane		89.8	%					
Toluene-d8		95.0	%					
p-Bromofluorobenzene		104.	%					
1,2-Dichloroethane-d4		91.5	%					



## Report of Analytical Results

**Client:** CH2MHill  
**Lab ID:** SD7472-10  
**Client ID:** IR88-GW31-10D  
**Project:** MCB Camp Lejeune CTO-WI  
**SDG:** WE31-1

**Sample Date:** 30-NOV-10  
**Received Date:** 02-DEC-10  
**Extract Date:** 03-DEC-10  
**Extracted By:** CB  
**Extraction Method:** EPA 625  
**Lab Prep Batch:** WG85796

**Analysis Date:** 04-DEC-10  
**Analyst:** WAS  
**Analysis Method:** EPA 625  
**Matrix:** AQ  
**% Solids:** NA  
**Report Date:** 14-DEC-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Bis(2-Chloroethyl) Ether	U	4.1	ug/L	1	5	5.1	1.0	4.1
1,3-Dichlorobenzene	U	4.1	ug/L	1	5	5.1	1.7	4.1
1,4-Dichlorobenzene	U	4.1	ug/L	1	5	5.1	2.0	4.1
1,2-Dichlorobenzene	J	3.4	ug/L	1	5	5.1	1.8	4.1
N-Nitroso-Di-N-Propylamine	U	4.1	ug/L	1	5	5.1	0.78	4.1
Hexachloroethane	U	4.1	ug/L	1	5	5.1	1.7	4.1
Nitrobenzene	U	4.1	ug/L	1	5	5.1	1.0	4.1
Isophorone	U	4.1	ug/L	1	5	5.1	0.85	4.1
Bis(2-Chloroethoxy) Methane	U	4.1	ug/L	1	5	5.1	0.90	4.1
1,2,4-Trichlorobenzene	U	4.1	ug/L	1	5	5.1	1.8	4.1
Hexachlorobutadiene	U	4.1	ug/L	1	5	5.1	1.6	4.1
Dimethyl Phthalate	U	4.1	ug/L	1	5	5.1	0.92	4.1
2,6-Dinitrotoluene	U	4.1	ug/L	1	5	5.1	0.62	4.1
2,4-Dinitrotoluene	U	4.1	ug/L	1	5	5.1	0.47	4.1
Diethylphthalate	U	4.1	ug/L	1	5	5.1	0.76	4.1
4-Chlorophenyl-Phenylether	U	4.1	ug/L	1	5	5.1	1.1	4.1
4-Bromophenyl-Phenylether	U	4.1	ug/L	1	5	5.1	1.1	4.1
Hexachlorobenzene	U	4.1	ug/L	1	5	5.1	0.93	4.1
Di-N-Butylphthalate		8.8	ug/L	1	5	5.1	0.78	4.1
Butylbenzylphthalate	U	4.1	ug/L	1	5	5.1	0.55	4.1
3,3'-Dichlorobenzidine	U	4.1	ug/L	1	5	5.1	1.8	4.1
Bis(2-Ethylhexyl) Phthalate	JB	2.1	ug/L	1	5	5.1	0.57	4.1
Di-N-Octylphthalate	U	4.1	ug/L	1	5	5.1	0.68	4.1
2-Fluorophenol		39.0	%					
Phenol-d6		21.1	%					
Nitrobenzene-d5		82.1	%					
2-Fluorobiphenyl		79.8	%					
2,4,6-Tribromophenol		104.	%					
Terphenyl-d14		84.9	%					

## Report of Analytical Results

Client: CH2MHill  
 Lab ID: SD7472-10RA  
 Client ID: IR88-GW31-10D  
 Project: MCB Camp Lejeune CTO-WI  
 SDG: WE31-1

Sample Date: 30-NOV-10  
 Received Date: 02-DEC-10  
 Extract Date: 03-DEC-10  
 Extracted By: CB  
 Extraction Method: SW846 3510  
 Lab Prep Batch: WG85798

Analysis Date: 17-DEC-10  
 Analyst: JCG  
 Analysis Method: SW846 M8270C  
 Matrix: AQ  
 % Solids: NA  
 Report Date: 23-DEC-10

Compound	Qualifier	Result	Units	Dilution	LOQ	ADJ LOQ	ADJ MDL	ADJ LOD
Naphthalene	B	7.2	ug/L	1	.2	0.20	0.065	0.10
2-Methylnaphthalene		1.4	ug/L	1	.2	0.20	0.078	0.10
Acenaphthylene	U	0.10	ug/L	1	.2	0.20	0.055	0.10
Acenaphthene		0.38	ug/L	1	.2	0.20	0.065	0.10
Fluorene	J	0.16	ug/L	1	.2	0.20	0.062	0.10
Phenanthrene	U	0.10	ug/L	1	.2	0.20	0.052	0.10
Anthracene	U	0.10	ug/L	1	.2	0.20	0.045	0.10
Fluoranthene	U	0.10	ug/L	1	.22	0.22	0.074	0.10
Pyrene	U	0.10	ug/L	1	.2	0.20	0.060	0.10
Benzo (a) anthracene	U	0.10	ug/L	1	.2	0.20	0.047	0.10
Chrysene	U	0.10	ug/L	1	.2	0.20	0.037	0.10
Benzo (b) Fluoranthene	U	0.10	ug/L	1	.27	0.28	0.091	0.10
Benzo(k)fluoranthene	U	0.10	ug/L	1	.2	0.20	0.050	0.10
Benzo(a)pyrene	U	0.10	ug/L	1	.2	0.20	0.067	0.10
Indeno (1,2,3-cd) pyrene	J	0.11	ug/L	1	.2	0.20	0.053	0.10
Dibenzo (a,h) anthracene	U	0.10	ug/L	1	.21	0.21	0.071	0.10
Benzo(g,h,i)perylene	U	0.10	ug/L	1	.2	0.20	0.066	0.10
2-Chloronaphthalene	U	0.10	ug/L	1	.2	0.20	0.073	0.10
2-Methylnaphthalene-D10	*	41.4	%					
Fluorene-D10	*	24.3	%					
pyrene-d10		93.7	%					

## Extractable Petroleum Hydrocarbon (EPH) Analysis

<b>Client:</b> CH2MHill	<b>SDG:</b> WE31-1
<b>Client Sample ID:</b> IR88-GW31-10D	<b>Date Collected:</b> 30-NOV-10
<b>KAS Sample ID:</b> SD7472-10RE	<b>Date Received:</b> 02-DEC-10
<b>Analytical Method:</b> MA DEP EPH 04-1.1	<b>Date Extracted:</b> 13-DEC-10
<b>Prep Method:</b> SW846 3520	<b>Date Reported:</b> 05-JAN-11
<b>Matrix:</b> AQ	<b>Percent Solids:</b> NA

EPH Range Results	Results	PQL	LOD	MDL	Units	DF	Date Analyzed	Qual
Unadjusted C11-C22 Aromatics	62	100	75	50	ug/L	1	18-DEC-10	JB
C9-C18 Aliphatics	75	100	75	50	ug/L	1	18-DEC-10	U
C19-C36 Aliphatics	75	100	75	50	ug/L	1	18-DEC-10	U
C11-C22 Aromatics	62	100	75	50	ug/L	1	18-DEC-10	JB

EPH Surrogate Recoveries	Recovery	Acceptance Range	Date Analyzed	Qual
5-alpha androstane	49	40-140	18-DEC-10	
1-Chlorooctadecane	49	40-140	18-DEC-10	
o-Terphenyl	52	40-140	18-DEC-10	
2-Fluorobiphenyl	79	40-140	18-DEC-10	
2-Bromonaphthalene	53	40-140	18-DEC-10	

\* Fractionation Surrogates.

1 Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.

2 C11-C22 Aromatic Hydrocarbons exclude the concentration of Target PAH Analytes.

3 Diesel PAH Analytes.

## Volatile Petroleum Hydrocarbon (VPH) Analysis

<b>Client:</b> CH2MHill	<b>SDG:</b> WE31-1
<b>Client Sample ID:</b> IR88-GW31-10D	<b>Date Collected:</b> 30-NOV-10
<b>KAS Sample ID:</b> SD7472-10	<b>Date Received:</b> 02-DEC-10
<b>Analytical Method:</b> MA DEP VPH 04-1.1	<b>Date Extracted:</b> 06-DEC-10
<b>Prep Method:</b> SW846 5030B	<b>Date Reported:</b> 04-JAN-11
<b>Matrix:</b> AQ	<b>Percent Solids:</b> NA

VPH Range Results	Results	PQL	LOD	MDL	Units	DF	Date Analyzed	Qual
Unadjusted C5-C8 Aliphatics	11000	100	75	50	ug/L	1	06-DEC-10	E
Unadjusted C9-C12 Aliphatics	3000	100	75	50	ug/L	1	06-DEC-10	E
C5-C8 Aliphatics	11000	100	75	50	ug/L	1	06-DEC-10	E
C9-C12 Aliphatics	320	100	75	50	ug/L	1	06-DEC-10	E
C9-C10 Aromatics	2700	100	75	50	ug/L	1	06-DEC-10	E

VPH Surrogate Recoveries	Recovery	Acceptance Range	Date Analyzed	Qual
2,5-Dibromotoluene (FID)	109	70-130	06-DEC-10	
2,5-Dibromotoluene (PID)	99	70-130	06-DEC-10	

1 Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.

2 C5-C8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.

3 C9-C12 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range AND concentration of C9-C10 Aromatic Hydrocarbons.



## Volatile Petroleum Hydrocarbon (VPH) Analysis

<b>Client:</b> CH2MHill	<b>SDG:</b> WE31-1
<b>Client Sample ID:</b> IR88-GW31-10D	<b>Date Collected:</b> 30-NOV-10
<b>KAS Sample ID:</b> SD7472-10DL2	<b>Date Received:</b> 02-DEC-10
<b>Analytical Method:</b> MA DEP VPH 04-1.1	<b>Date Extracted:</b> 07-DEC-10
<b>Prep Method:</b> SW846 5030B	<b>Date Reported:</b> 06-JAN-11
<b>Matrix:</b> AQ	<b>Percent Solids:</b> NA

VPH Range Results	Results	PQL	LOD	MDL	Units	DF	Date Analyzed	Qual
Unadjusted C5-C8 Aliphatics	42000	2000	1500	1000	ug/L	20	07-DEC-10	E
Unadjusted C9-C12 Aliphatics	3600	2000	1500	1000	ug/L	20	07-DEC-10	
C5-C8 Aliphatics	42000	2000	1500	1000	ug/L	20	07-DEC-10	E
C9-C12 Aliphatics	1200	2000	1500	1000	ug/L	20	07-DEC-10	J
C9-C10 Aromatics	2500	2000	1500	1000	ug/L	20	07-DEC-10	

VPH Surrogate Recoveries	Recovery	Acceptance Range	Date Analyzed	Qual
2,5-Dibromotoluene (FID)	86	70-130	07-DEC-10	
2,5-Dibromotoluene (PID)	90	70-130	07-DEC-10	

1 Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.

2 C5-C8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.

3 C9-C12 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range AND concentration of C9-C10 Aromatic Hydrocarbons.



## Volatile Petroleum Hydrocarbon (VPH) Analysis

<b>Client:</b> CH2MHill	<b>SDG:</b> WE31-1
<b>Client Sample ID:</b> IR88-GW31-10D	<b>Date Collected:</b> 30-NOV-10
<b>KAS Sample ID:</b> SD7472-10DL3	<b>Date Received:</b> 02-DEC-10
<b>Analytical Method:</b> MA DEP VPH 04-1.1	<b>Date Extracted:</b> 08-DEC-10
<b>Prep Method:</b> SW846 5030B	<b>Date Reported:</b> 06-JAN-11
<b>Matrix:</b> AQ	<b>Percent Solids:</b> NA

VPH Range Results	Results	PQL	LOD	MDL	Units	DF	Date Analyzed	Qual
Unadjusted C5-C8 Aliphatics	50000	10000	7500	5000	ug/L	100	08-DEC-10	
Unadjusted C9-C12 Aliphatics	7500	10000	7500	5000	ug/L	100	08-DEC-10	U
C5-C8 Aliphatics	50000	10000	7500	5000	ug/L	100	08-DEC-10	
C9-C12 Aliphatics	7500	10000	7500	5000	ug/L	100	08-DEC-10	U
C9-C10 Aromatics	7500	10000	7500	5000	ug/L	100	08-DEC-10	U

VPH Surrogate Recoveries	Recovery	Acceptance Range	Date Analyzed	Qual
2,5-Dibromotoluene (FID)	93	70-130	08-DEC-10	
2,5-Dibromotoluene (PID)	88	70-130	08-DEC-10	

1 Hydrocarbon Range data exclude concentrations of any surrogate(s) and/or internal standards eluting in that range.

2 C5-C8 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range.

3 C9-C12 Aliphatic Hydrocarbons exclude the concentration of Target Analytes eluting in that range AND concentration of C9-C10 Aromatic Hydrocarbons.

Client <u>CH2M HILL</u>		Contact <u>Rebekah Shaw</u>	Phone # <u>(757) 671-6279</u>	Fax # <u>( )</u>
Address <u>5700 Cleveland St. Suite 101</u>		City <u>Virginia Beach</u>	State <u>VA</u>	Zip Code <u>23462</u>
Purchase Order # <u>942085</u>	Proj. Name / No. <u>408943. FIFES</u>	Katahdin Quote #		

Bill (if different than above) Address

Sampler (Print / Sign) Daniel Brown [Signature] Copies To:

<b>LAB USE ONLY</b>	WORK ORDER #:	<b>ANALYSIS AND CONTAINER TYPE PRESERVATIVES</b>
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KATAHDIN PROJECT NUMBER

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP °C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Filt. OY ON									
					VOCs	VPH	EPH	SVOC	1c101 Chemical					
	AST45-5781-SBCL-4-5-10	12/14/10 1030	Soil	8	X	X	X	X	X					
	AST45-5781-SBCL-4-5-10-MS	12/14/10 1030	Soil	8	X	X	X	X	X					
	AST45-5781-SBCL-4-5-10-S2	12/14/10 1030	Soil	8	X	X	X	X	X					
	AST45-5781-SBCL-7-9-10	12/14/10 1030	Soil	8	X	X	X	X	X					
	SOIL TRTP BLANK	/		6	X	X								
	WE31-EB121410	12/14/10 1400	GW	10	X	X	X	X	X					
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Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)





600 Technology Way  
Scarborough, ME 04074  
Tel: (207) 874-2400  
Fax: (207) 775-4029

## CHAIN of CUSTODY

PLEASE BEAR DOWN AND  
PRINT LEGIBLY IN PEN

Page \_\_\_\_ of \_\_\_\_

Client CH2M HILL Contact Rebeka Shaw Phone # (757) 671-6279 Fax # ( )

Address 5700 Cleveland St. City Virginia Beach State VA Zip Code 23462

Purchase Order # Camp Lejeune WE31 Proj. Name / No. 408943, FI, FS Katahdin Quote #

Bill (if different than above) 942085 Address

Sampler (Print / Sign) Daniel Brown [Signature]

Copies To:

### LAB USE ONLY

WORK ORDER #:

KATAHDIN PROJECT NUMBER

REMARKS:

SHIPPING INFO: ☐ FED EX ☐ UPS ☐ CLIENT

AIRBILL NO:

TEMP °C ☐ TEMP BLANK ☐ INTACT ☐ NOT INTACT

### ANALYSIS AND CONTAINER TYPE PRESERVATIVES

*	Sample Description	Date / Time coll'd	Matrix	No. of Cntrs.	Filt. OY ON	Filt. OY ON	Filt. OY ON	Filt. OY ON	Filt. OY ON	Filt. OY ON	Filt. OY ON	Filt. OY ON	Filt. OY ON	Filt. OY ON
					VOCs	UPH	EPH	SVOC	Total Chromium/Lead					
	UST 1817-SB01-5-7-10D	12/13/10 1120	Soil	8	X	X	X	X	X					
	UST 1817-SB01-10-12-10D	/ 1140		8					X					
	UST 1817-SB01-15-17-10D	/ 1200		8					X					
	UST 1601-SB01-4-5-10D	/ 1350		8					X					
	UST 1601-SB01-4-5-10D	/ 1355		8					X					
	UST 1601-SB01-7-9-10D	/ 1410		8					X					
	UST 25-SB01-4-5-10D	/ 1600		8	↓	↓	↓	↓						
	SOIL TRIP BLANK	/		6	X	X								
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COMMENTS

Relinquished By: (Signature) <u>[Signature]</u>	Date / Time <u>12/14/10 1600</u>	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

THE TERMS AND CONDITIONS ON THE REVERSE SIDE HEREOF SHALL GOVERN  
SERVICES, EXCEPT WHEN A SIGNED CONTRACTUAL AGREEMENT EXISTS.

CUSTOMER C



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PRINT LEGIBLY IN PEN**

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Client	CH2M HILL	Contact	Rebekha Shaw ( )	Phone #	( )	Fax #	( )
Address	5700 Cleveland St. Suite 101	City	Virginia Beach	State	VA	Zip Code	23462
Purchase Order #	942085	Proj. Name / No.	408943, FI, FS	Katahdin Quote #			

Bill (if different than above)	Address
--------------------------------	---------

Sampler (Print / Sign) <u>Daniel Brown</u> 	Copies To:
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[illegible][illegible]

COMMENTS
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Relinquished By: (Signature) 	Date / Time 12/14/16 1600	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)
Relinquished By: (Signature)	Date / Time	Received By: (Signature)	Relinquished By: (Signature)	Date / Time	Received By: (Signature)

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**CUSTOMER COPY**